

UNIVERSITI TEKNOLOGI MARA

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ABSTRACT

The problem that has faced the manufacturer is the control of the process input parameters to obtain a good welded joint with the required weld quality. The weld parameters can be chosen to produce a welded joint that closely meets the joint qualities. This research focuses on optimizing the Gas Metal Arc Welding (GMAW) process parameters to improve the mechanical properties of welded joints, crucial for the performance and reliability of structures. By systematically adjusting parameters like welding current, voltage, speed, and shielding gas composition using experimental design and statistical tools, we aim to maximize tensile strength, hardness, and impact toughness while minimizing defects. The study employs Response Surface Methodology (RSM) to model complex relationships and explores the microstructural changes through metallographic analysis. The findings will contribute to enhancing GMAW welding technology, offering valuable insights for industries aiming to boost the quality and efficiency of welded structures while minimizing costs.

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